

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P437640

Luminaire Tested: **ISC-SA1E-727-U-T3-HSS**

Issue Date: 12/9/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P437640  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-9)  
Test Lab: INNOVATION CENTER  
Issue Date: 12/9/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: ISC-SA1E-727-U-T3-HSS  
Description: IMPACT ELITE LED CYLINDER LUMINAIRE  
(1) 70 CRI, 2700K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE III OPTICS  
WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4427 lumens  
Efficiency: N/A  
Efficacy: 76.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 58.2  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

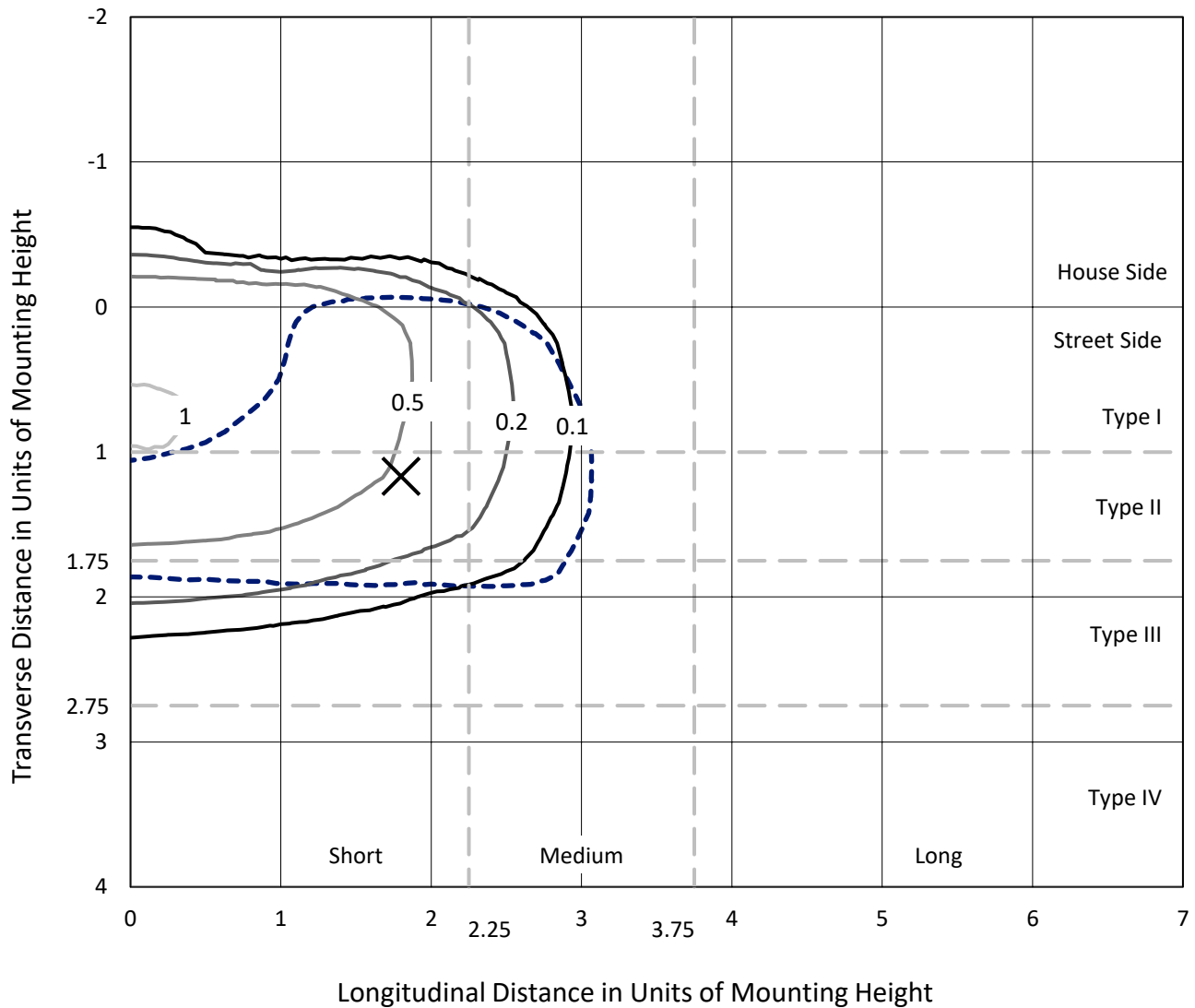


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## Iso-Footcandle Lines of Horizontal Illumination

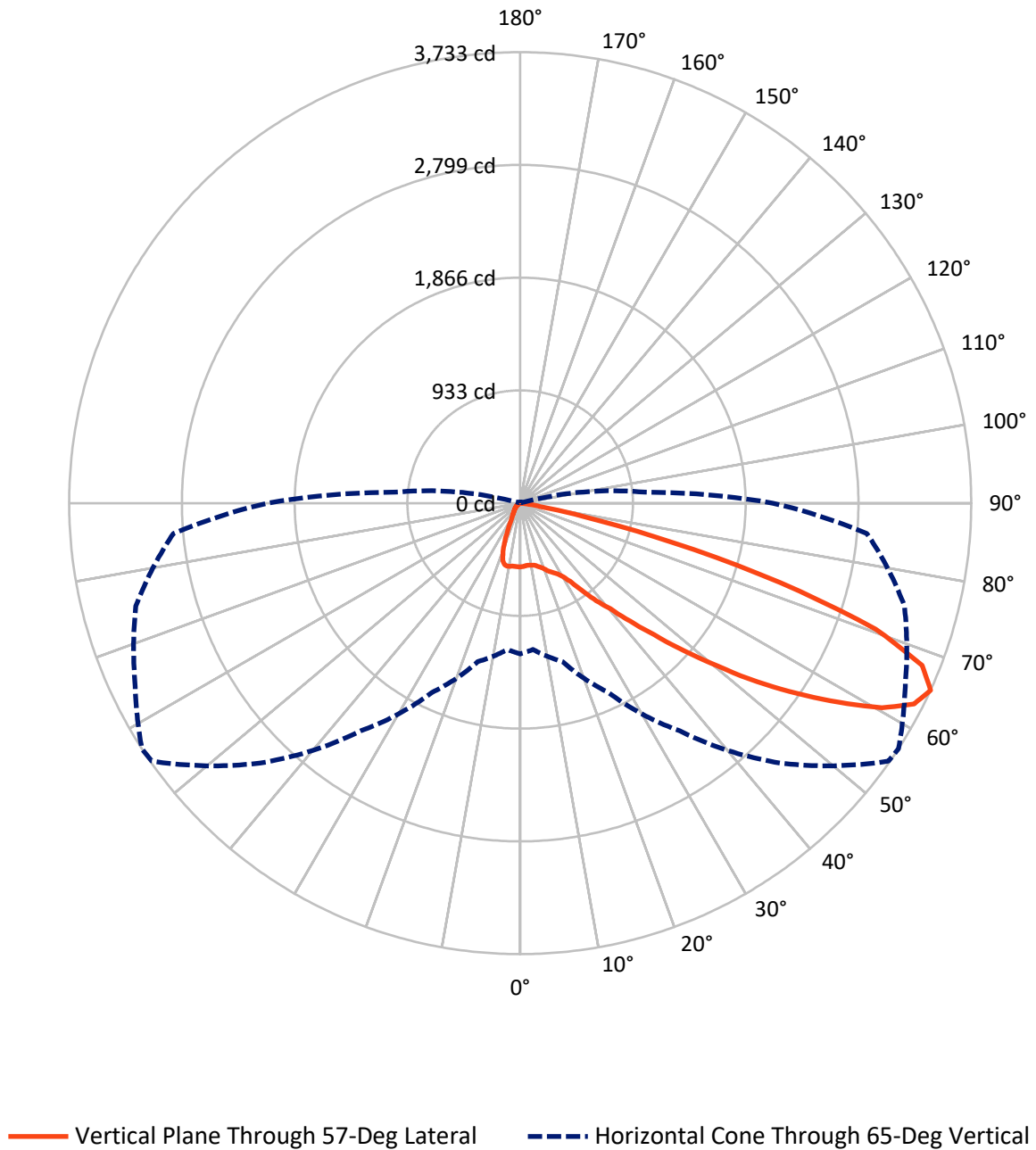
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.1 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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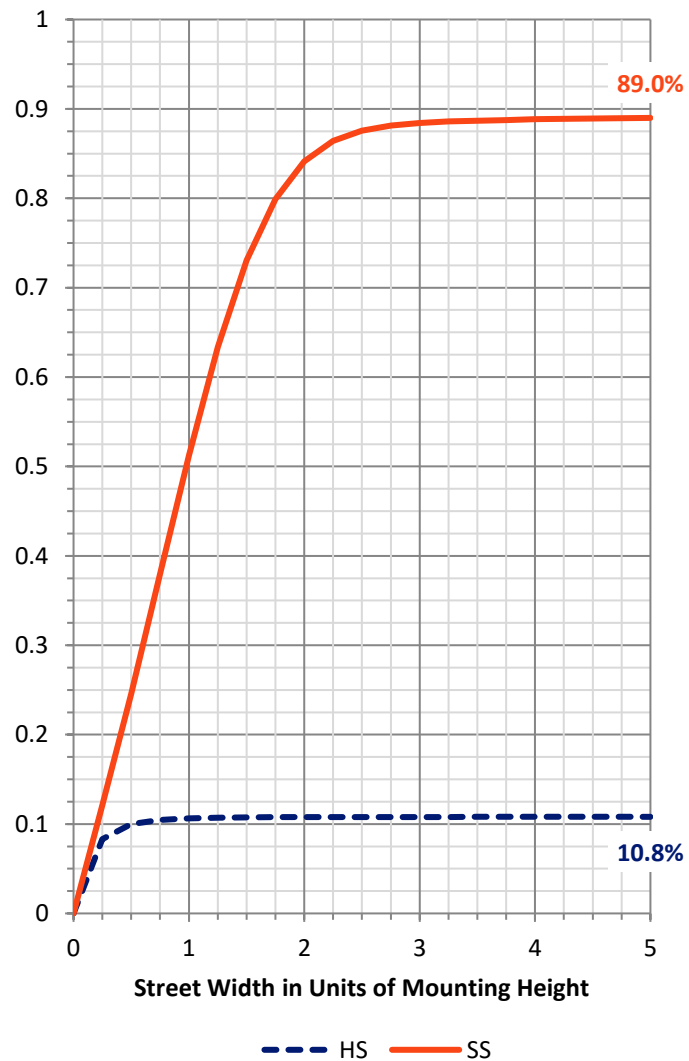
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 482.9    | 0.0    | 482.9  |
|                    | % Fixture | 10.9     | 0.0    | 10.9   |
| <b>Street Side</b> | Lumens    | 3944.1   | 0.0    | 3944.1 |
|                    | % Fixture | 89.1     | 0.0    | 89.1   |
| <b>Total</b>       | Lumens    | 4427.0   | 0.0    | 4427.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 49.0   | 1.1       |
| 10°-20°   | 132.5  | 3.0       |
| 20°-30°   | 228.8  | 5.2       |
| 30°-40°   | 405.3  | 9.2       |
| 40°-50°   | 735.0  | 16.6      |
| 50°-60°   | 1238.1 | 28.0      |
| 60°-70°   | 1273.1 | 28.8      |
| 70°-80°   | 352.8  | 8.0       |
| 80°-90°   | 12.5   | 0.3       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4427.0 | 100.0     |
| 0°-180°   | 4427.0 | 100.0     |

**Coefficient of Utilization**



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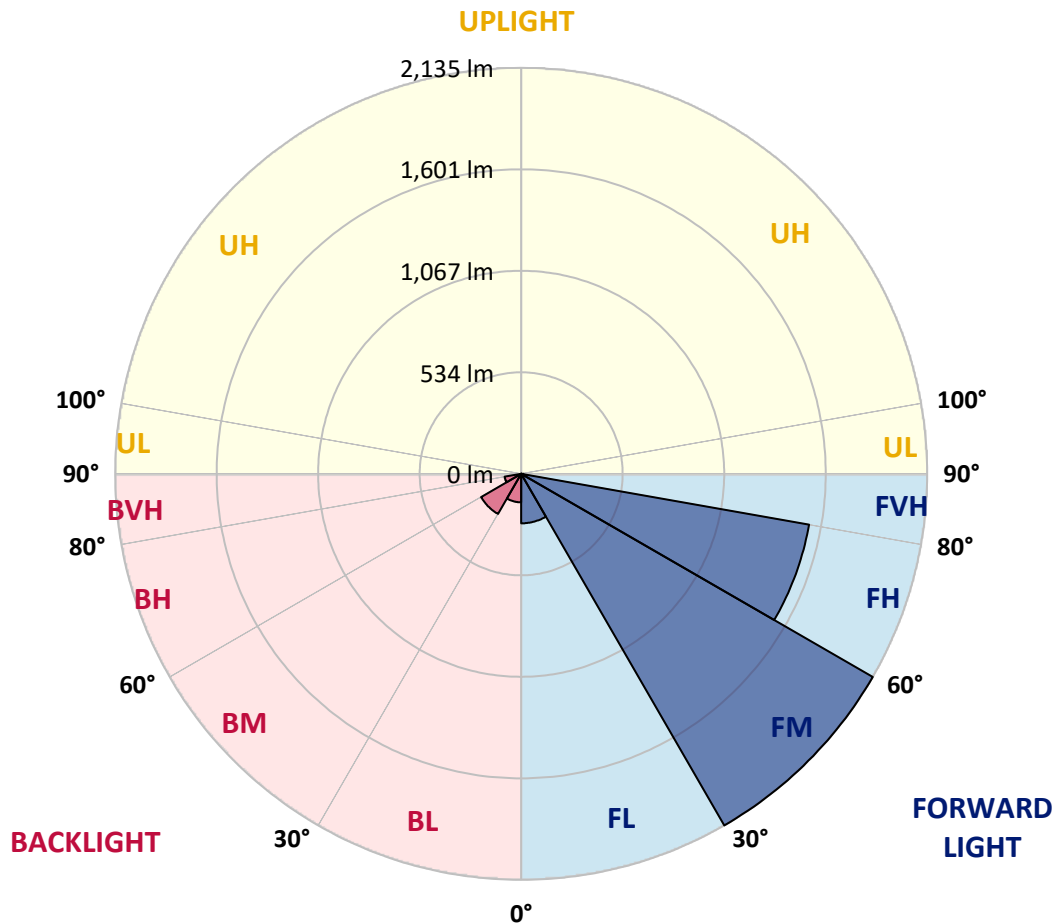
CATALOG NUMBER: ISC-SA1E-727-U-T3-HSS

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 260.3  | 5.9       |                         |      |         |
| FM   | (30°-60°)   | 2134.9 | 48.2      |                         |      |         |
| FH   | (60°-80°)   | 1537.3 | 34.7      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 11.6   | 0.3       |                         |      | G1/100  |
| BL   | (0°-30°)    | 149.9  | 3.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 243.5  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 88.6   | 2.0       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.9    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 57°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  | 526.8  |
| 2.5°  | 511.6  | 511.6  | 516.0  | 518.1  | 518.1  | 520.3  | 522.4  | 524.6  | 524.6  | 524.6  | 528.9  |
| 5°    | 485.7  | 483.6  | 487.9  | 492.2  | 498.7  | 507.3  | 513.8  | 518.1  | 524.6  | 531.1  | 533.2  |
| 7.5°  | 462.0  | 462.0  | 466.3  | 472.8  | 485.7  | 498.7  | 511.6  | 518.1  | 528.9  | 541.9  | 546.2  |
| 10°   | 455.5  | 453.4  | 459.8  | 466.3  | 479.3  | 494.4  | 513.8  | 522.4  | 537.5  | 554.8  | 561.3  |
| 12.5° | 451.2  | 451.2  | 453.4  | 464.1  | 477.1  | 496.5  | 520.3  | 526.8  | 550.5  | 569.9  | 585.0  |
| 15°   | 449.0  | 449.0  | 453.4  | 462.0  | 477.1  | 498.7  | 531.1  | 541.9  | 569.9  | 598.0  | 610.9  |
| 17.5° | 466.3  | 464.1  | 462.0  | 466.3  | 481.4  | 505.2  | 548.3  | 559.1  | 593.7  | 628.2  | 643.3  |
| 20°   | 518.1  | 516.0  | 509.5  | 494.4  | 494.4  | 522.4  | 569.9  | 582.9  | 628.2  | 662.8  | 671.4  |
| 22.5° | 615.3  | 621.7  | 598.0  | 559.1  | 531.1  | 544.0  | 598.0  | 613.1  | 664.9  | 701.6  | 701.6  |
| 25°   | 755.6  | 746.9  | 725.4  | 660.6  | 604.5  | 578.6  | 621.7  | 636.8  | 699.5  | 742.6  | 734.0  |
| 27.5° | 902.4  | 904.5  | 874.3  | 800.9  | 710.2  | 641.2  | 647.6  | 664.9  | 736.2  | 785.8  | 766.4  |
| 30°   | 1019.0 | 1010.3 | 995.2  | 934.8  | 835.5  | 740.5  | 697.3  | 708.1  | 777.2  | 833.3  | 816.0  |
| 32.5° | 1122.6 | 1118.3 | 1098.8 | 1047.0 | 958.5  | 857.0  | 779.3  | 781.5  | 835.5  | 904.5  | 883.0  |
| 35°   | 1215.4 | 1219.7 | 1211.1 | 1152.8 | 1072.9 | 977.9  | 889.4  | 895.9  | 936.9  | 1008.2 | 965.0  |
| 37.5° | 1332.0 | 1332.0 | 1316.9 | 1262.9 | 1202.5 | 1107.5 | 1023.3 | 1025.4 | 1047.0 | 1105.3 | 1051.3 |
| 40°   | 1433.5 | 1437.8 | 1435.6 | 1394.6 | 1336.3 | 1250.0 | 1148.5 | 1148.5 | 1155.0 | 1224.0 | 1196.0 |
| 42.5° | 1571.6 | 1578.1 | 1575.9 | 1537.1 | 1491.7 | 1429.1 | 1342.8 | 1336.3 | 1332.0 | 1418.3 | 1388.1 |
| 45°   | 1748.6 | 1763.8 | 1770.2 | 1722.7 | 1681.7 | 1645.0 | 1578.1 | 1552.2 | 1563.0 | 1642.9 | 1619.1 |
| 47.5° | 1917.0 | 1934.3 | 1964.5 | 1940.8 | 1921.3 | 1921.3 | 1830.7 | 1826.4 | 1809.1 | 1901.9 | 1837.2 |
| 50°   | 2076.8 | 2078.9 | 2122.1 | 2158.8 | 2217.1 | 2206.3 | 2145.9 | 2120.0 | 2094.0 | 2156.7 | 2040.1 |
| 52.5° | 2167.4 | 2193.4 | 2249.5 | 2355.3 | 2482.6 | 2534.4 | 2471.8 | 2456.7 | 2404.9 | 2396.3 | 2236.5 |
| 55°   | 2251.6 | 2251.6 | 2340.2 | 2523.7 | 2739.5 | 2849.6 | 2797.8 | 2780.6 | 2676.9 | 2646.7 | 2439.5 |
| 57.5° | 2279.7 | 2271.1 | 2389.8 | 2623.0 | 2946.8 | 3138.9 | 3149.7 | 3110.8 | 2966.2 | 2873.4 | 2646.7 |
| 60°   | 2139.4 | 2124.3 | 2249.5 | 2558.2 | 3002.9 | 3348.3 | 3464.9 | 3439.0 | 3216.6 | 3093.6 | 2864.7 |
| 62.5° | 1735.7 | 1755.1 | 1914.9 | 2249.5 | 2804.3 | 3326.7 | 3674.3 | 3659.2 | 3402.3 | 3242.5 | 2951.1 |
| 65°   | 1247.8 | 1215.4 | 1357.9 | 1729.2 | 2301.3 | 3041.8 | 3721.8 | 3732.6 | 3516.7 | 3292.2 | 2879.9 |
| 67.5° | 699.5  | 669.2  | 788.0  | 1070.8 | 1636.4 | 2495.6 | 3527.5 | 3587.9 | 3434.7 | 3169.1 | 2573.3 |
| 70°   | 267.7  | 285.0  | 367.0  | 528.9  | 965.0  | 1722.7 | 3035.3 | 3121.6 | 3011.5 | 2644.5 | 1917.0 |
| 72.5° | 95.0   | 107.9  | 151.1  | 235.3  | 446.9  | 928.3  | 2122.1 | 2251.6 | 2219.3 | 1837.2 | 1096.7 |
| 75°   | 56.1   | 58.3   | 77.7   | 114.4  | 196.5  | 362.7  | 1198.1 | 1306.1 | 1254.3 | 908.9  | 453.4  |
| 77.5° | 38.9   | 38.9   | 49.7   | 69.1   | 112.3  | 144.6  | 468.5  | 531.1  | 546.2  | 328.1  | 133.8  |
| 80°   | 23.7   | 25.9   | 34.5   | 45.3   | 64.8   | 66.9   | 144.6  | 170.5  | 159.8  | 116.6  | 47.5   |
| 82.5° | 10.8   | 10.8   | 19.4   | 30.2   | 32.4   | 28.1   | 45.3   | 49.7   | 58.3   | 51.8   | 21.6   |
| 85°   | 0.0    | 0.0    | 6.5    | 10.8   | 8.6    | 6.5    | 15.1   | 15.1   | 19.4   | 23.7   | 10.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 2.2    | 2.2    | 2.2    | 2.2    | 2.2    | 4.3    | 2.2    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 526.8  | 526.8  | 526.8 | 526.8 | 526.8 | 526.8 | 526.8 | 526.8 | 526.8 | 526.8 | 526.8 |
| 2.5°  | 528.9  | 531.1  | 528.9 | 526.8 | 526.8 | 524.6 | 524.6 | 524.6 | 524.6 | 524.6 | 524.6 |
| 5°    | 533.2  | 535.4  | 533.2 | 528.9 | 524.6 | 520.3 | 516.0 | 516.0 | 516.0 | 516.0 | 520.3 |
| 7.5°  | 546.2  | 546.2  | 541.9 | 533.2 | 522.4 | 518.1 | 509.5 | 507.3 | 503.0 | 500.8 | 503.0 |
| 10°   | 565.6  | 565.6  | 557.0 | 544.0 | 526.8 | 509.5 | 494.4 | 472.8 | 459.8 | 451.2 | 449.0 |
| 12.5° | 585.0  | 582.9  | 572.1 | 554.8 | 526.8 | 487.9 | 438.2 | 384.3 | 351.9 | 328.1 | 323.8 |
| 15°   | 610.9  | 608.8  | 591.5 | 561.3 | 513.8 | 431.8 | 334.6 | 261.2 | 222.4 | 205.1 | 202.9 |
| 17.5° | 639.0  | 634.7  | 610.9 | 565.6 | 472.8 | 326.0 | 220.2 | 170.5 | 155.4 | 151.1 | 151.1 |
| 20°   | 669.2  | 662.8  | 626.1 | 559.1 | 390.7 | 222.4 | 153.3 | 142.5 | 140.3 | 138.2 | 138.2 |
| 22.5° | 693.0  | 682.2  | 636.8 | 526.8 | 291.4 | 153.3 | 136.0 | 133.8 | 131.7 | 129.5 | 129.5 |
| 25°   | 718.9  | 701.6  | 645.5 | 455.5 | 192.1 | 131.7 | 127.4 | 125.2 | 120.9 | 118.7 | 118.7 |
| 27.5° | 749.1  | 723.2  | 658.4 | 358.4 | 133.8 | 118.7 | 114.4 | 112.3 | 105.8 | 101.5 | 101.5 |
| 30°   | 788.0  | 755.6  | 664.9 | 261.2 | 112.3 | 103.6 | 99.3  | 95.0  | 86.4  | 82.0  | 82.0  |
| 32.5° | 850.6  | 822.5  | 652.0 | 174.9 | 101.5 | 92.8  | 86.4  | 77.7  | 69.1  | 64.8  | 62.6  |
| 35°   | 930.4  | 891.6  | 606.6 | 123.1 | 90.7  | 82.0  | 71.2  | 60.4  | 54.0  | 51.8  | 51.8  |
| 37.5° | 1019.0 | 967.1  | 537.5 | 99.3  | 82.0  | 71.2  | 60.4  | 49.7  | 43.2  | 41.0  | 41.0  |
| 40°   | 1144.2 | 1064.3 | 442.6 | 86.4  | 71.2  | 60.4  | 49.7  | 41.0  | 36.7  | 34.5  | 34.5  |
| 42.5° | 1308.2 | 1187.3 | 334.6 | 79.9  | 64.8  | 51.8  | 41.0  | 34.5  | 30.2  | 28.1  | 28.1  |
| 45°   | 1491.7 | 1316.9 | 243.9 | 71.2  | 56.1  | 43.2  | 32.4  | 28.1  | 23.7  | 21.6  | 21.6  |
| 47.5° | 1675.2 | 1409.7 | 168.4 | 64.8  | 47.5  | 36.7  | 28.1  | 21.6  | 17.3  | 17.3  | 15.1  |
| 50°   | 1835.0 | 1459.4 | 120.9 | 56.1  | 43.2  | 30.2  | 21.6  | 17.3  | 15.1  | 13.0  | 13.0  |
| 52.5° | 1975.3 | 1480.9 | 92.8  | 49.7  | 36.7  | 25.9  | 17.3  | 15.1  | 13.0  | 13.0  | 13.0  |
| 55°   | 2094.0 | 1463.7 | 73.4  | 43.2  | 32.4  | 21.6  | 15.1  | 13.0  | 10.8  | 10.8  | 10.8  |
| 57.5° | 2210.6 | 1411.9 | 58.3  | 36.7  | 25.9  | 15.1  | 13.0  | 10.8  | 8.6   | 8.6   | 8.6   |
| 60°   | 2271.1 | 1344.9 | 47.5  | 30.2  | 21.6  | 13.0  | 10.8  | 8.6   | 8.6   | 6.5   | 6.5   |
| 62.5° | 2230.1 | 1208.9 | 38.9  | 25.9  | 15.1  | 10.8  | 8.6   | 6.5   | 6.5   | 4.3   | 4.3   |
| 65°   | 2091.9 | 1036.2 | 30.2  | 19.4  | 10.8  | 8.6   | 6.5   | 6.5   | 4.3   | 2.2   | 2.2   |
| 67.5° | 1763.8 | 811.7  | 23.7  | 15.1  | 8.6   | 6.5   | 4.3   | 4.3   | 2.2   | 0.0   | 0.0   |
| 70°   | 1260.7 | 535.4  | 19.4  | 10.8  | 6.5   | 6.5   | 4.3   | 2.2   | 0.0   | 0.0   | 0.0   |
| 72.5° | 727.5  | 259.1  | 15.1  | 6.5   | 4.3   | 4.3   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   |
| 75°   | 272.0  | 90.7   | 13.0  | 6.5   | 4.3   | 2.2   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   |
| 77.5° | 90.7   | 36.7   | 10.8  | 8.6   | 6.5   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 28.1   | 17.3   | 4.3   | 4.3   | 4.3   | 4.3   | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 15.1   | 8.6    | 2.2   | 2.2   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 6.5    | 4.3    | 2.2   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.2    | 2.2    | 2.2   | 2.2   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

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### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-727-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2741   | CRI (Ra): | 71.5 |      |       |
| CIE u':                   | 0.2605 | R1:       | 69.2 | R9:  | -16.1 |
| CIE v':                   | 0.5272 | R2:       | 79.4 | R10: | 51.4  |
| Duv:                      | 0.0005 | R3:       | 87.8 | R11: | 63.1  |
| CIE x:                    | 0.4573 | R4:       | 69.4 | R12: | 42.0  |
| CIE y:                    | 0.4113 | R5:       | 66.4 | R13: | 70.2  |
| CIE z:                    | 0.1313 | R6:       | 69.8 | R14: | 92.4  |
| Peak Wavelength (nm):     | 602    | R7:       | 79.8 |      |       |
| Dominant Wavelength (nm): | 583    | R8:       | 50.1 |      |       |
| Purity:                   | 61.2   |           |      |      |       |
| Rf:                       | 69.9   |           |      |      |       |
| Rg:                       | 98.3   |           |      |      |       |



### Test Conditions

Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

REPORT NUMBER: SP1-1908-441-1-R4

CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2044             | 0.0              | 490       | 7179             | 1.0              | 620       | 118034           | 30.7             | 750       | 8362             | 0.0              | 880       | 3128             | 0.0              |
| 365       | 2016             | 0.0              | 495       | 10476            | 1.9              | 625       | 111884           | 24.7             | 755       | 7635             | 0.0              | 885       | 3110             | 0.0              |
| 370       | 2020             | 0.0              | 500       | 15549            | 3.4              | 630       | 106119           | 19.2             | 760       | 6582             | 0.0              | 890       | 2632             | 0.0              |
| 375       | 2137             | 0.0              | 505       | 22477            | 6.3              | 635       | 99706            | 15.0             | 765       | 5777             | 0.0              | 895       | 2709             | 0.0              |
| 380       | 2046             | 0.0              | 510       | 30417            | 10.4             | 640       | 92142            | 11.0             | 770       | 5474             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1925             | 0.0              | 515       | 39274            | 16.3             | 645       | 84987            | 8.2              | 775       | 4977             | 0.0              | 905       | 1748             | 0.0              |
| 390       | 1893             | 0.0              | 520       | 47282            | 22.9             | 650       | 78016            | 5.7              | 780       | 4723             | 0.0              | 910       | 2046             | 0.0              |
| 395       | 1695             | 0.0              | 525       | 55413            | 29.7             | 655       | 71541            | 4.1              | 785       | 4219             | 0.0              | 915       | 1844             | 0.0              |
| 400       | 1633             | 0.0              | 530       | 62377            | 36.7             | 660       | 64863            | 2.7              | 790       | 3969             | 0.0              | 920       | 2734             | 0.0              |
| 405       | 2065             | 0.0              | 535       | 68520            | 42.5             | 665       | 58485            | 1.9              | 795       | 4122             | 0.0              | 925       | 2307             | 0.0              |
| 410       | 3449             | 0.0              | 540       | 73435            | 47.8             | 670       | 51641            | 1.1              | 800       | 2864             | 0.0              | 930       | 2039             | 0.0              |
| 415       | 7117             | 0.0              | 545       | 78677            | 52.4             | 675       | 46030            | 0.8              | 805       | 3151             | 0.0              | 935       | 1784             | 0.0              |
| 420       | 13992            | 0.0              | 550       | 83331            | 56.6             | 680       | 40590            | 0.5              | 810       | 3022             | 0.0              | 940       | 2464             | 0.0              |
| 425       | 25176            | 0.1              | 555       | 89120            | 60.9             | 685       | 35691            | 0.3              | 815       | 3471             | 0.0              | 945       | 2794             | 0.0              |
| 430       | 38151            | 0.3              | 560       | 94613            | 64.3             | 690       | 31631            | 0.2              | 820       | 2749             | 0.0              | 950       | 3090             | 0.0              |
| 435       | 49673            | 0.6              | 565       | 99818            | 66.4             | 695       | 27437            | 0.1              | 825       | 2729             | 0.0              | 955       | 1866             | 0.0              |
| 440       | 57273            | 0.9              | 570       | 106526           | 69.3             | 700       | 24589            | 0.1              | 830       | 2282             | 0.0              | 960       | 3110             | 0.0              |
| 445       | 54802            | 1.1              | 575       | 111610           | 69.4             | 705       | 21832            | 0.0              | 835       | 3140             | 0.0              | 965       | 3880             | 0.0              |
| 450       | 39184            | 1.0              | 580       | 117163           | 69.6             | 710       | 19500            | 0.0              | 840       | 2365             | 0.0              | 970       | 3243             | 0.0              |
| 455       | 22506            | 0.8              | 585       | 122201           | 67.9             | 715       | 17870            | 0.0              | 845       | 3024             | 0.0              | 975       | 2014             | 0.0              |
| 460       | 13692            | 0.6              | 590       | 125662           | 65.0             | 720       | 15924            | 0.0              | 850       | 2510             | 0.0              | 980       | 1688             | 0.0              |
| 465       | 9446             | 0.5              | 595       | 127415           | 60.4             | 725       | 14268            | 0.0              | 855       | 2739             | 0.0              | 985       | 2827             | 0.0              |
| 470       | 6698             | 0.4              | 600       | 129155           | 55.7             | 730       | 12438            | 0.0              | 860       | 3515             | 0.0              | 990       | 4172             | 0.0              |
| 475       | 5328             | 0.4              | 605       | 128057           | 49.6             | 735       | 11255            | 0.0              | 865       | 3600             | 0.0              | 995       | 3177             | 0.0              |
| 480       | 5081             | 0.5              | 610       | 126031           | 43.3             | 740       | 9951             | 0.0              | 870       | 3609             | 0.0              | 1000      | 3241             | 0.0              |
| 485       | 5579             | 0.7              | 615       | 123059           | 37.1             | 745       | 8870             | 0.0              | 875       | 3208             | 0.0              |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 2044                          | 0.0                            | 490               | 7179                          | 6.0                            | 620               | 118034                        | 0.1                            | 750               | 8362                          | 0.0                            | 880               | 3128                          | 0.0                            |
| 365               | 2016                          | 0.0                            | 495               | 10476                         | 8.6                            | 625               | 111884                        | 0.1                            | 755               | 7635                          | 0.0                            | 885               | 3110                          | 0.0                            |
| 370               | 2020                          | 0.0                            | 500               | 15549                         | 12.5                           | 630               | 106119                        | 0.0                            | 760               | 6582                          | 0.0                            | 890               | 2632                          | 0.0                            |
| 375               | 2137                          | 0.0                            | 505               | 22477                         | 17.3                           | 635               | 99706                         | 0.0                            | 765               | 5777                          | 0.0                            | 895               | 2709                          | 0.0                            |
| 380               | 2046                          | 0.0                            | 510               | 30417                         | 21.8                           | 640               | 92142                         | 0.0                            | 770               | 5474                          | 0.0                            | 900               | 2016                          | 0.0                            |
| 385               | 1925                          | 0.0                            | 515               | 39274                         | 25.7                           | 645               | 84987                         | 0.0                            | 775               | 4977                          | 0.0                            | 905               | 1748                          | 0.0                            |
| 390               | 1893                          | 0.0                            | 520               | 47282                         | 27.5                           | 650               | 78016                         | 0.0                            | 780               | 4723                          | 0.0                            | 910               | 2046                          | 0.0                            |
| 395               | 1695                          | 0.0                            | 525               | 55413                         | 28.1                           | 655               | 71541                         | 0.0                            | 785               | 4219                          | 0.0                            | 915               | 1844                          | 0.0                            |
| 400               | 1633                          | 0.0                            | 530               | 62377                         | 27.0                           | 660               | 64863                         | 0.0                            | 790               | 3969                          | 0.0                            | 920               | 2734                          | 0.0                            |
| 405               | 2065                          | 0.0                            | 535               | 68520                         | 24.7                           | 665               | 58485                         | 0.0                            | 795               | 4122                          | 0.0                            | 925               | 2307                          | 0.0                            |
| 410               | 3449                          | 0.1                            | 540               | 73435                         | 21.5                           | 670               | 51641                         | 0.0                            | 800               | 2864                          | 0.0                            | 930               | 2039                          | 0.0                            |
| 415               | 7117                          | 0.5                            | 545               | 78677                         | 18.3                           | 675               | 46030                         | 0.0                            | 805               | 3151                          | 0.0                            | 935               | 1784                          | 0.0                            |
| 420               | 13992                         | 1.6                            | 550               | 83331                         | 15.0                           | 680               | 40590                         | 0.0                            | 810               | 3022                          | 0.0                            | 940               | 2464                          | 0.0                            |
| 425               | 25176                         | 3.9                            | 555               | 89120                         | 12.0                           | 685               | 35691                         | 0.0                            | 815               | 3471                          | 0.0                            | 945               | 2794                          | 0.0                            |
| 430               | 38151                         | 8.1                            | 560               | 94613                         | 9.3                            | 690               | 31631                         | 0.0                            | 820               | 2749                          | 0.0                            | 950               | 3090                          | 0.0                            |
| 435               | 49673                         | 13.3                           | 565               | 99818                         | 7.0                            | 695               | 27437                         | 0.0                            | 825               | 2729                          | 0.0                            | 955               | 1866                          | 0.0                            |
| 440               | 57273                         | 19.1                           | 570               | 106526                        | 5.2                            | 700               | 24589                         | 0.0                            | 830               | 2282                          | 0.0                            | 960               | 3110                          | 0.0                            |
| 445               | 54802                         | 21.6                           | 575               | 111610                        | 3.7                            | 705               | 21832                         | 0.0                            | 835               | 3140                          | 0.0                            | 965               | 3880                          | 0.0                            |
| 450               | 39184                         | 18.1                           | 580               | 117163                        | 2.6                            | 710               | 19500                         | 0.0                            | 840               | 2365                          | 0.0                            | 970               | 3243                          | 0.0                            |
| 455               | 22506                         | 11.8                           | 585               | 122201                        | 1.8                            | 715               | 17870                         | 0.0                            | 845               | 3024                          | 0.0                            | 975               | 2014                          | 0.0                            |
| 460               | 13692                         | 8.1                            | 590               | 125662                        | 1.2                            | 720               | 15924                         | 0.0                            | 850               | 2510                          | 0.0                            | 980               | 1688                          | 0.0                            |
| 465               | 9446                          | 6.2                            | 595               | 127415                        | 0.8                            | 725               | 14268                         | 0.0                            | 855               | 2739                          | 0.0                            | 985               | 2827                          | 0.0                            |
| 470               | 6698                          | 4.8                            | 600               | 129155                        | 0.5                            | 730               | 12438                         | 0.0                            | 860               | 3515                          | 0.0                            | 990               | 4172                          | 0.0                            |
| 475               | 5328                          | 4.1                            | 605               | 128057                        | 0.4                            | 735               | 11255                         | 0.0                            | 865               | 3600                          | 0.0                            | 995               | 3177                          | 0.0                            |
| 480               | 5081                          | 4.1                            | 610               | 126031                        | 0.2                            | 740               | 9951                          | 0.0                            | 870               | 3609                          | 0.0                            | 1000              | 3241                          | 0.0                            |
| 485               | 5579                          | 4.6                            | 615               | 123059                        | 0.1                            | 745               | 8870                          | 0.0                            | 875               | 3208                          | 0.0                            |                   |                               |                                |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2145.7 M/P: 0.35**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2044             | 0.0              | 490       | 7179             | 11.1             | 620       | 118034           | 1.5              | 750       | 8362             | 0.0              | 880       | 3128             | 0.0              |
| 365       | 2016             | 0.0              | 495       | 10476            | 16.9             | 625       | 111884           | 0.9              | 755       | 7635             | 0.0              | 885       | 3110             | 0.0              |
| 370       | 2020             | 0.0              | 500       | 15549            | 26.0             | 630       | 106119           | 0.6              | 760       | 6582             | 0.0              | 890       | 2632             | 0.0              |
| 375       | 2137             | 0.0              | 505       | 22477            | 38.2             | 635       | 99706            | 0.4              | 765       | 5777             | 0.0              | 895       | 2709             | 0.0              |
| 380       | 2046             | 0.0              | 510       | 30417            | 51.6             | 640       | 92142            | 0.2              | 770       | 5474             | 0.0              | 900       | 2016             | 0.0              |
| 385       | 1925             | 0.0              | 515       | 39274            | 65.1             | 645       | 84987            | 0.1              | 775       | 4977             | 0.0              | 905       | 1748             | 0.0              |
| 390       | 1893             | 0.0              | 520       | 47282            | 75.2             | 650       | 78016            | 0.1              | 780       | 4723             | 0.0              | 910       | 2046             | 0.0              |
| 395       | 1695             | 0.0              | 525       | 55413            | 82.9             | 655       | 71541            | 0.1              | 785       | 4219             | 0.0              | 915       | 1844             | 0.0              |
| 400       | 1633             | 0.0              | 530       | 62377            | 86.0             | 660       | 64863            | 0.0              | 790       | 3969             | 0.0              | 920       | 2734             | 0.0              |
| 405       | 2065             | 0.1              | 535       | 68520            | 85.4             | 665       | 58485            | 0.0              | 795       | 4122             | 0.0              | 925       | 2307             | 0.0              |
| 410       | 3449             | 0.2              | 540       | 73435            | 81.1             | 670       | 51641            | 0.0              | 800       | 2864             | 0.0              | 930       | 2039             | 0.0              |
| 415       | 7117             | 0.7              | 545       | 78677            | 75.4             | 675       | 46030            | 0.0              | 805       | 3151             | 0.0              | 935       | 1784             | 0.0              |
| 420       | 13992            | 2.3              | 550       | 83331            | 68.1             | 680       | 40590            | 0.0              | 810       | 3022             | 0.0              | 940       | 2464             | 0.0              |
| 425       | 25176            | 6.2              | 555       | 89120            | 60.9             | 685       | 35691            | 0.0              | 815       | 3471             | 0.0              | 945       | 2794             | 0.0              |
| 430       | 38151            | 13.0             | 560       | 94613            | 52.9             | 690       | 31631            | 0.0              | 820       | 2749             | 0.0              | 950       | 3090             | 0.0              |
| 435       | 49673            | 22.2             | 565       | 99818            | 44.8             | 695       | 27437            | 0.0              | 825       | 2729             | 0.0              | 955       | 1866             | 0.0              |
| 440       | 57273            | 32.0             | 570       | 106526           | 37.6             | 700       | 24589            | 0.0              | 830       | 2282             | 0.0              | 960       | 3110             | 0.0              |
| 445       | 54802            | 36.7             | 575       | 111610           | 30.4             | 705       | 21832            | 0.0              | 835       | 3140             | 0.0              | 965       | 3880             | 0.0              |
| 450       | 39184            | 30.4             | 580       | 117163           | 24.1             | 710       | 19500            | 0.0              | 840       | 2365             | 0.0              | 970       | 3243             | 0.0              |
| 455       | 22506            | 19.7             | 585       | 122201           | 18.7             | 715       | 17870            | 0.0              | 845       | 3024             | 0.0              | 975       | 2014             | 0.0              |
| 460       | 13692            | 13.2             | 590       | 125662           | 14.0             | 720       | 15924            | 0.0              | 850       | 2510             | 0.0              | 980       | 1688             | 0.0              |
| 465       | 9446             | 10.0             | 595       | 127415           | 10.2             | 725       | 14268            | 0.0              | 855       | 2739             | 0.0              | 985       | 2827             | 0.0              |
| 470       | 6698             | 7.7              | 600       | 129155           | 7.3              | 730       | 12438            | 0.0              | 860       | 3515             | 0.0              | 990       | 4172             | 0.0              |
| 475       | 5328             | 6.7              | 605       | 128057           | 5.0              | 735       | 11255            | 0.0              | 865       | 3600             | 0.0              | 995       | 3177             | 0.0              |
| 480       | 5081             | 6.9              | 610       | 126031           | 3.4              | 740       | 9951             | 0.0              | 870       | 3609             | 0.0              | 1000      | 3241             | 0.0              |
| 485       | 5579             | 8.1              | 615       | 123059           | 2.3              | 745       | 8870             | 0.0              | 875       | 3208             | 0.0              |           |                  |                  |

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**TM-30-18**

### Summary

$R_f = 69.9$   
 $R_g = 98.3$   
 $CIE R_a = 71.5$   
 $R_g = -16.1$



### Color Vector Graphics



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**TM-30-18**

**Individual Sample Fidelity Index ( $R_{f,i}$ )**

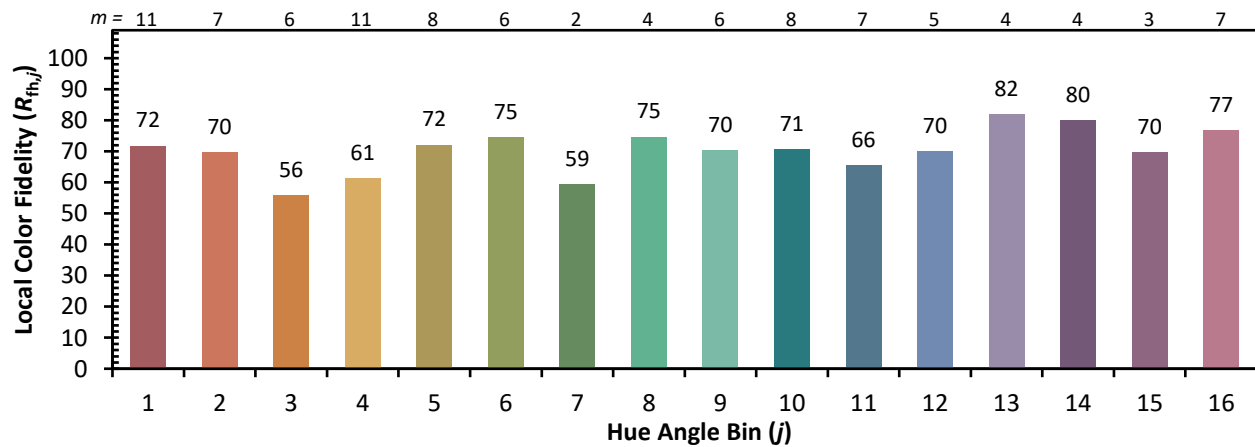
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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**TM-30-18**

Color Rendition by Hue-Angle Bin



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)